

MORE PRACTICE WITH MOLES, MOLAR MASS, AND NUMBER OF PARTICLES

- Aluminum metal is produced by passing an electric current through a solution of aluminum oxide, Al_2O_3 , dissolved in molten cryolite, Na_3AlF_6 .
 - Determine the molar mass of each of these two substances.
 - Determine the quantity, in moles, of 100 g of each substance.
- Ascorbic acid, more commonly known to you as Vitamin C, is an essential vitamin. As it is not soluble in fat, our bodies cannot store the substance and, as a result, you must make it a part of your daily diet.
 - What is the molar mass of vitamin C, given that its formula is $\text{C}_6\text{H}_8\text{O}_6$?
 - Determine the mass of 2.84×10^{-3} moles, the quantity of vitamin C in a typical tablet.
- The molecular formula of acetylsalicylic acid (aspirin), one of the most commonly used pain relievers, is $\text{C}_9\text{H}_8\text{O}_4$. Determine:
 - The molar mass of aspirin
 - The number of moles in a 500 mg sample ($1 \text{ mg} = 0.001 \text{ g}$)
 - The number of molecules in the above sample
 - The number of carbon atoms in the above sample
- Determine the quantity, in moles, of each of the following substances:

a. 100 g of water	e. 0.010 g of nitrogen dioxide
b. 500 g of iron	f. 2500 g of potassium sulfate
c. 150 g of iron(III) oxide	g. 710 g of chlorine
d. 23 g of calcium chloride	h. 200 g of potassium perchlorate

The following two questions are to be submitted for assessment

- Aspartame is an artificial sweetener that is 160 times sweeter than sucrose (table sugar) when dissolved in water. It is marketed as *NutraSweet*. The molecular formula of aspartame is $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_5$.
 - Determine the mass of 1.56 moles of aspartame.
 - Determine the number of molecules in 500 mg of aspartame.
 - Determine the number of nitrogen atoms in 1.2 g of aspartame.
- The nitrite ion is often used as a food preservative. This ion has been linked to dimethylnitrosamine, $(\text{CH}_3)_2\text{N}_2\text{O}$, a cancer causing substance that may be formed in foods, beverages, or gastric juices from the reaction of nitrite with other substances. Determine the mass, in grams, of one molecule of dimethylnitrosamine.